

★DOWA P81;U11 1999-410769/35 ★JP 11163411-A
LED lamp for optical communication — has strips connecting support plate with lead frames and central section, which are then cut to detach frames, finally

DOWA MINING CO LTD 1997.11.28 1997JP-344222

U12 W02 X26 (1999.06.18) H01L 33/00, G02B 17/00

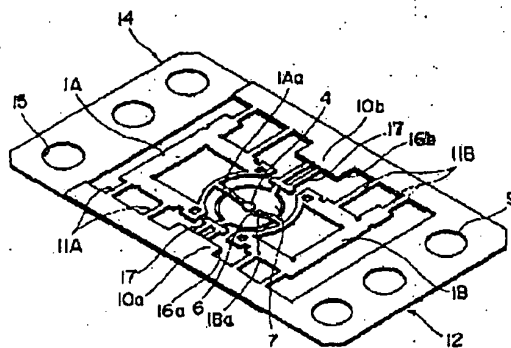
NOVELTY - A plate (14) supports the lead frames (1A,1B) attached to LED chip and lead terminals (1Aa,1Ba) through strips (11A,11B). The LED chip, lead terminal and plate are embedded in transparent resin. Then, the strips (11A,11B) for lead frames and strip (17) for connecting central section (7) are cut, to detach frames. DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for the LED lamp manufacturing method.

Use: For optical communication.

Advantage: Shortens manufacturing process, hence excels in mass production and economical efficiency. Does not have resin boundary between support plate and transparent resin, hence prevents deterioration by permeation of air, water. Eliminates need for expensive and troublesome deposition such as metal thin film formation. DESCRIPTION OF DRAWING(S) - The figure is the top view of lead from supporting the lamp. (1A,1B) Lead frames; (1Aa,1Ba) Lead terminals; (7) Central section; (11A,11B,17) Connection strips; (14) Plate. (9pp Dwg.No.3/8)

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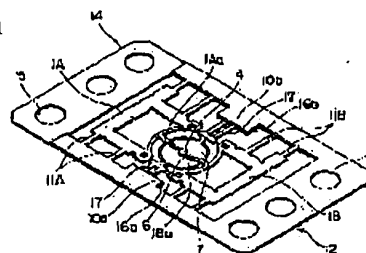
(72)Inventor : MARUYAMA TSUKASA

(54) LAMP DEVICE FOR OPTICAL COMMUNICATION AND MANUFACTURING METHOD THEREFOR

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a low cost reflecting LED lamp device and a manufacturing method therefor, in which a manufacturing process is greatly shortened, superior in mass production, strong and heat-resistant, and wherein a lead frame in which a LED chip is attached to a lead terminal and a material having a concave reflecting mirror opposite the LED chip are integrally molded through the use of resin.

SOLUTION: A framed lead frame 12, in which lead frames 1A and 1B are supported on a frame 10 by supporting legs 11A and 11B and a framed concave reflecting mirror 14 in which a concave reflecting mirror 7, is supported on a frame 16 by a supporting leg 17 and which is provided with bright plating are manufactured by punching or etching and press-molding of a metallic sheet, integrally molded by jointing the frames to each other, and a device body containing a LED chip and the concave reflecting mirror 7 is embedded completely in a transparent resin 2 by molding, after which each supporting legs 11A, 11B and 17 is cut down and separated from each frame.



LEGAL STATUS

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CLAIMS

[Claim(s)]

[Claim 1] It is lamp equipment which carried out mould fabrication of the material which has the leadframe which attached the Light Emitting Diode chip in the lead terminal, and the lieberkuhn which counters the aforementioned Light Emitting Diode chip in one by the resin. a leadframe -- support -- the metal leadframe with **** and metal lieberkuhn which were supported in the frame section by the leg -- support, after unifying the lieberkuhn with **** supported in the frame section by the leg by junction between **** support of the aforementioned leadframe after laying completely the aforementioned Light Emitting Diode chip, the aforementioned lead terminal, and the aforementioned lieberkuhn underground in a light-transmission nature resin by mould fabrication -- support of a leg and the aforementioned lieberkuhn -- the lamp equipment for optical communication which cuts a leg, separates each **** and is characterized by the bird clapper

[Claim 2] The aforementioned leadframe with **** is lamp equipment for optical communication according to claim 1 characterized by having pierced from the metal sheet and being obtained by processing or etching processing.

[Claim 3] The aforementioned lieberkuhn with **** is lamp equipment for optical communication according to claim 1 or 2 characterized by what was acquired by press-forming processing after punching processing of a metal sheet or etching processing.

[Claim 4] The aforementioned lead terminal is lamp equipment for optical communication according to claim 1 to 3 characterized by being arranged in the state of mounting, without being bent and contacting the periphery of the aforementioned lieberkuhn.

[Claim 5] The aforementioned leadframe with **** and the aforementioned lieberkuhn with **** are lamp equipment for optical communication according to claim 1 to 4 which is the same quality of the material and is characterized by the bird clapper from the metal sheet of the same thickness.

[Claim 6] Lamp equipment for optical communication which bends the aforementioned leadframe portion of the couple which exposed to the exterior of this light-transmission nature resin the base center section of the aforementioned light-transmission nature resin under which the aforementioned lead terminal and the aforementioned lieberkuhn are laid while protruding caudad to a lower part side along with the lateral surface of a light-transmission nature resin, respectively, and inserts the edge of this leadframe into a pars-basilaris-ossis-occipitalis side in the shape of level, constitutes in an equipment back face, and is characterized by the bird clapper.

[Claim 7] It is the manufacture method of the lamp equipment which carries out mould fabrication of the material which has the leadframe which attached the Light Emitting Diode chip in the lead terminal, and the lieberkuhn which counters the aforementioned Light Emitting Diode chip in one by the resin. The leadframe with **** supported in the frame section by the leg is made punching processing or etching processing of a metal sheet the product made from a twist. support -- The lieberkuhn with **** supported in the frame section by the leg is made punching processing or etching processing, and press-forming processing of a metal sheet the product made from a twist. support -- After unifying the aforementioned leadframe with ****, and the aforementioned lieberkuhn with **** by junction of ****, support of the aforementioned leadframe after laying completely the aforementioned Light Emitting Diode chip, the aforementioned lead terminal, and the aforementioned lieberkuhn underground in a light-transmission nature resin by mould

fabrication -- support of a leg and the aforementioned lieberkuhn -- the manufacture method of the lamp equipment for optical communication characterized by cutting a leg and separating each ****

[Claim 8] The manufacture method of the lamp equipment for optical communication according to claim 7 characterized by arranging two or more aforementioned concave surface reflecting mirrors with **** on the metal sheet of one sheet while arranging two or more aforementioned leadframes with **** on the metal sheet of one sheet, performing separation processing of junction, mould fabrication, and the frame section between the leadframe with **** which corresponds, respectively, and a concave surface reflecting mirror with ****, and obtaining two or more lamp equipments in simultaneous.

[Claim 9] Lamp equipment for optical communication according to claim 1 to 6 characterized by carrying out space transmission of the voice and the image data of a video camera at a television monitor equipped with a photo detector.

[Claim 10] Lamp equipment for optical communication according to claim 1 to 6 characterized by carrying out space transmission of the image data of a digital camera at a computer equipped with a photo detector.

[Claim 11] Lamp equipment for optical communication according to claim 1 to 6 characterized by measuring the interval between mutual vehicles of the upper shell automobile of a signal.

[Claim 12] Lamp equipment for optical communication according to claim 1 to 6 characterized by detecting the penetration object which advances into a specific zone.

[Claim 13] Lamp equipment for optical communication according to claim 1 to 6 characterized by operating a home electrical-and-electric-equipment product equipped with a photo detector by remote control.

[Claim 14] Lamp equipment for optical communication according to claim 1 to 6 characterized by performing optical space transmission in a small-scale field communication network.

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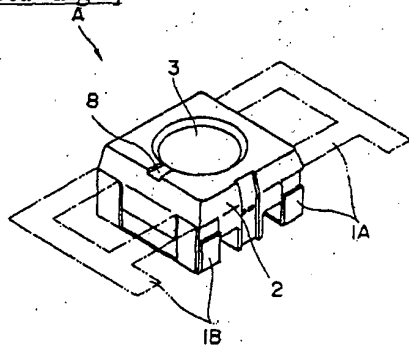
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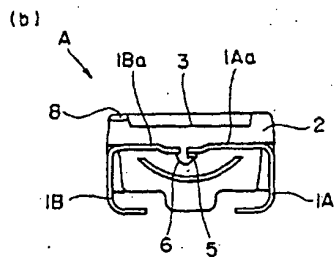
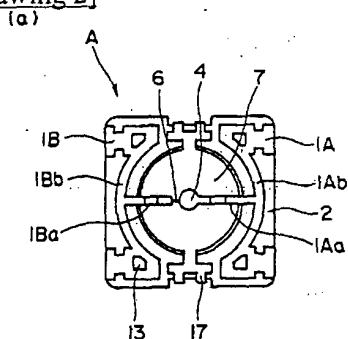
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DRAWINGS

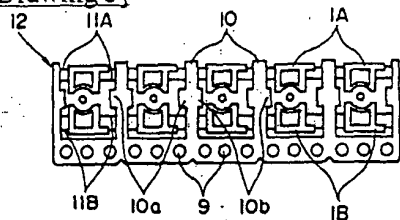
[Drawing 1]



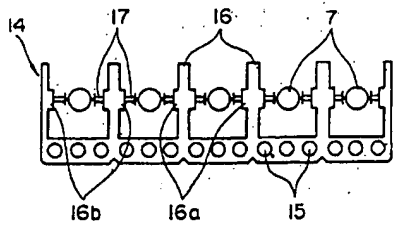
[Drawing 2]



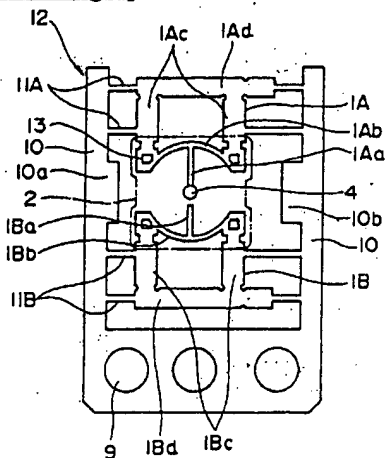
[Drawing 3]



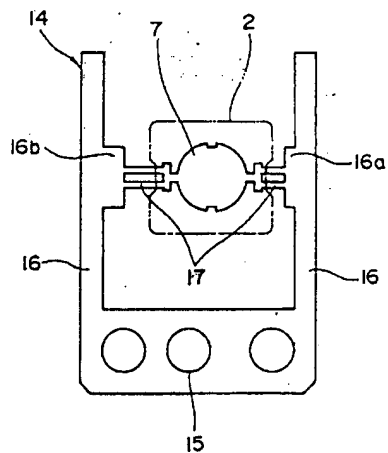
[Drawing 4]



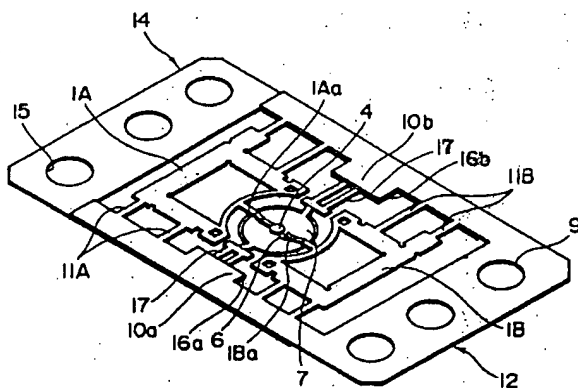
[Drawing 5]



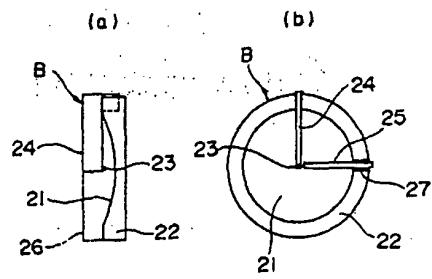
[Drawing 6]



[Drawing 7]



[Drawing 8]



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to the reflected type Light Emitting Diode lamp equipment which countered the light emitting device and has arranged the parabola type reflector, and its manufacture method.

[0002]

[Description of the Prior Art] About the lamp equipment for optical communication which carries out opposite arrangement of a parabola type reflector or the concave reflector, and makes the reflected light a directive beam-like beam of light at the Light Emitting Diode chip which attached in the leadframe and has been arranged backward to the direction of a light emission, JP,1-87567,U, JP,6-209124,A, JP,7-211940,A, and JP,9-55540,A have a publication, for example.

[0003] The Light Emitting Diode lamp B which comes to join the light-transmission nature resin 26 by which mould fabrication was carried out to JP,1-87567,U at the grade in which the lead board 25 which carried out contiguity arrangement with the metal base 22 which equips a front face with the concave mirror 21 which makes a paraboloid as shown in drawing 8, and the lead board 24 which attached the Light Emitting Diode chip 23 hides is indicated.

[0004] A reflecting mirror is combined with the support strip (leadframe) which attached the semiconductor chip, and the photoelectrical slave surrounded to one by the light-transmission nature resin except for the leg of a support strip is indicated by JP,6-209124,A.

[0005] The leadframe which equips with a Light Emitting Diode chip the frame by the opaque resin which established the hollow formed in the reflector in JP,7-211940,A is attached, and the Light Emitting Diode luminescence equipment wrapped in transparence or the translucent resin is indicated.

[0006] Moreover, the photogenic organ which comes to join the plinth which is equipped with the concave surface section and mounted in a substrate, and the light emitting diode object by the light-transmission nature resin equipped with the convex section corresponding to the aforementioned concave surface section while laying a light emitting device and a lead terminal underground is indicated by JP,9-55540,A.

[0007]

[Problem(s) to be Solved by the Invention] However, since the high temperature by the pewter reflow conducts directly to the interface of a concave mirror 21 and the light-transmission nature resin 26 through the metal base 22 at the time of substrate mounting with the Light Emitting Diode lamp B in the design of JP,1-87567,U shown in drawing 8, there is a possibility of producing the crack and ablation of an interface by the difference of coefficient of thermal expansion, and mounting by reflow soldering is difficult. Moreover, since the paraboloid of a concave mirror 21 is formed by polishing, as for production, time and effort is this thing. Furthermore, in order to plan electric insulation between a concave mirror 21 and the lead board 25, the disposal in which the lead board 25 is floated to the anchoring slot made at the metal base 22 was needed, and the complicated fitting processing between which a spacer 27 is made to be placed to prevent the optical leakage from an anchoring slot was needed.

[0008] If it is in invention of JP,6-209124,A, since the reflecting mirror is attached with meanses, such as a support strip (leadframe) and an engagement element, and processing and assembly of

this portion are complicated, the load of the temperature change accompanying lighting putting out lights of a lamp is applied to this field, and it has a bad influence on the life of Light Emitting Diode. Furthermore, if a lamp becomes small, when an engagement element will not obtain an oak colander small, either but processing and assembly will become still more difficult, the junction force may become weaker by the miniaturization of an engagement part, and junction may become unstable. When resin enclosure of the junction is carried out in the unstable state, as a result of a resin's entering the crevice between joints and a reflecting mirror's shifting from the right position to it, it will have a remarkable bad influence on the optical property of a lamp. Furthermore, when forming with insulators, such as plastics material which gave the reflection nature metal thin film, there was a problem of troublesome vacuum evaporatio~~no~~ or sputtering processing needing in order to form a metal thin film so that there may be no nonuniformity of thickness, and needing the large-scale and expensive leased facility of the vacuum aspirator and others for it.

[0009] If it was in invention of JP,7-211940,A, the reflector is formed with the opaque resin and there was a problem in glossiness as compared with a metallic-reflection side, and the leadframe had been made to the frame around the reflector and it was attached in the slot in the state of installation, and it cut with the point of electric insulation and there was a problem in the point of optical leakage from a slot.

[0010] In invention of JP,9-55540,A, the plinth was a product made of a resin, the vacuum evaporatio~~no~~ coat of reflection nature metals, such as aluminum, etc. was given to the concave surface section, the overcoat layer by the resin was further given to it as this object for vacuum evaporatio~~no~~ side protection, and while the manufacturing process was complicated, there was a problem that we were anxious about ablation by degradation with the passage of time which considers the moisture of atmosphere etc. as a cause in the interface between a reflecting mirror and a light emitting diode object.

[0011] That is, if it was in such a Prior art, there were the following problems.

(1) Generally, mass-production nature of the manufacturing process was bad multi-stage, it needed the large-scale reflector formation facility of exclusive use, and was high cost.

(2) Especially in the thing which combined the metallic-reflection side and the lead terminal using junction or the engagement element, the load of the temperature change accompanying lighting putting out lights of a lamp is applied to this portion, and it has a bad influence on the life as a Light Emitting Diode lamp.

(3) If it is furthermore in some which need formation of the metal thin film reflector by vacuum evaporatio~~no~~ or sputtering, in order to lessen thickness nonuniformity of a reflector, the large-scale facility of exclusive use, such as a vacuum aspirator, was needed, and the limitation was in reduction of an initial cost.

(4) Moreover, about a metal thin film reflector, when the elevated temperature ~~**~~(ed) by the pewter reflow etc. on the occasion of substrate mounting of lamp equipment, a crack and exfoliation were produced without the ability finishing bearing a differential thermal expansion with contact-resin material, and there was a problem of being easy to deteriorate.

(5) If it was furthermore in some which prepared the interface of a resin in the portion of a reflector, the atmosphere, moisture, etc. might permeate the interface of a resin and a reflector and there was a problem of producing degradation by exfoliation of a reflector with time.

[0012] In view of the above situation, in the reflected type Light Emitting Diode lamp equipment which this invention countered the Light Emitting Diode chip, and formed the concave reflector, a manufacturing process is shortened sharply, and it excels in mass-production nature, and it is strong, it is thermally strong that there is no influence of heating at the time of mounting etc., and it aims at the lamp equipment of the low cost which degradation with time does not have, either, and offer of the manufacturing method.

[0013]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, this invention is lamp equipment which carried out mould fabrication of the leadframe which attached the Light Emitting Diode chip in the lead terminal, and the material which has the concave surface reflecting mirror which counters the aforementioned Light Emitting Diode chip in one by the resin. support -

- the metal leadframe with **** supported in the frame section by the leg, and support, after unifying the concave surface reflecting mirror with **** supported in the frame section by the leg by junction between **** After laying completely the aforementioned Light Emitting Diode chip, the aforementioned lead terminal, and the aforementioned concave surface reflecting mirror underground in a light-transmission nature resin by mould fabrication, support of the aforementioned leadframe -- support of a leg and the aforementioned concave surface reflecting mirror -- the lamp equipment for optical communication which cuts a leg and comes to separate each **** The lamp equipment for optical communication which pierced the aforementioned leadframe with **** from the metal sheet, and was obtained by processing or etching processing The aforementioned concave surface reflecting mirror with **** the punching processing rear stirrup of a metal sheet After etching processing, the lamp equipment for optical communication arranged in the state of mounting, without bending the aforementioned lead terminal and contacting the periphery of the aforementioned concave surface reflecting mirror in the lamp equipment for optical communication obtained by press-forming processing -- and The aforementioned leadframe with **** and the aforementioned concave surface reflecting mirror with **** the lamp equipment for optical communication obtained from the metal sheet of the same thickness with the same quality of the material And while protruding below, the base center section of the aforementioned light-transmission nature resin under which the aforementioned lead terminal and the aforementioned concave surface reflecting mirror are laid again The aforementioned leadframe of the couple exposed to the exterior of this light-transmission nature resin is bent to a lower part side along the outside side of a light-transmission nature resin, respectively, and the edge of this leadframe is inserted into a bottom side in the shape of level, and the lamp equipment for optical communication which it comes to constitute in an equipment back face is offered.

[0014] Furthermore, this invention is the manufacture method of the lamp equipment which carries out mould fabrication of the leadframe which attached the Light Emitting Diode chip in the lead terminal, and the material which has the concave surface reflecting mirror which counters the aforementioned Light Emitting Diode chip in one by the resin. The leadframe with **** supported in the frame section by the leg is made punching processing or etching processing of a metal sheet the product made from a twist. support -- The concave surface reflecting mirror with **** supported in the frame section by the leg is made punching processing or etching processing, and press-forming processing of a metal sheet the product made from a twist. support -- After unifying the aforementioned leadframe with ****, and the aforementioned concave surface reflecting mirror with **** by junction of ****, After laying completely the aforementioned Light Emitting Diode chip, the aforementioned lead terminal, and the aforementioned concave surface reflecting mirror underground in a light-transmission nature resin by mould fabrication, support of the aforementioned leadframe -- support of a leg and the aforementioned concave surface reflecting mirror, while arranging two or more manufacture methods of the lamp equipment for optical communication which cuts a leg and separated each ****, and aforementioned leadframes with **** on the metal sheet of one sheet Two or more aforementioned concave surface reflecting mirrors with **** are arranged on the metal sheet of one sheet. The manufacture method of the lamp equipment for optical communication of performing separation processing of junction, mould fabrication, and the frame section between the aforementioned leadframe with **** which corresponds, respectively, and the aforementioned concave surface reflecting mirror with ****, and having obtained two or more lamp equipments in simultaneous is offered.

[0015] this invention furthermore, the lamp equipment for optical communication which carries out space transmission of the voice and the image data of a video camera to a television monitor equipped with a photo detector The lamp equipment for optical communication which carries out space transmission of the image data of a digital camera to a computer equipped with a photo detector The lamp equipment for optical communication which measures the interval between mutual vehicles of the upper shell automobile of a signal The lamp equipment for optical communication which operates the home electrical-and-electric-equipment product equipped with a photo detector for the lamp equipment for optical communication which detects the penetration

object which advances into a specific zone by remote control, and the lamp equipment for optical communication which performs optical space transmission in a small-scale field communication network (LAN) are offered.

[0016]

[Embodiments of the Invention] The drawing by the example explains the lamp equipment of this invention.

[0017] As shown in drawing 1, the lamp equipment A of this invention carries out mould fabrication, forms the optical ejection aperture 3 in a front face, inserts the base side of Leadframes 1A and 1B into the state where envelopment laying under the ground of the part for the terminal area of the leadframes 1A and 1B of the couple which carried out opposite arrangement was completely carried out with the light-transmission nature resin 2, and forms it the lieberkuhn and ahead [its] (illustration upper part) at the mounting section.

[0018] Namely, as lamp equipment A is shown in (a) of drawing 2, and the cross section of (b) The Light Emitting Diode chip 5 is attached in the tooth back of a round 4 prepared at the nose of cam of lead-terminal 1Aa of leadframe 1A of a tabular. Bonding of the golden wire 6 is carried out between lead-terminal 1Ba(s) of another side prepared by carrying out right-and-left opposite, and the metal lieberkuhn 7 of a tabular is arranged in opposite behind the Light Emitting Diode chip 5, and it has considered as the state where envelopment laying under the ground was completely carried out by mould fabrication of the light-transmission nature resin 2. It bends, and a mould Plastic solid is inserted in, makes an edge the form where an equipment back face is made to constitute so that the leadframes 1A and 1B exposed outside may be further wrapped in along with a mould Plastic solid by foaming processing, and has summarized it to equipment strong and compact substrate mounting type while it changes a base center section into a protrusion state caudad. 8 is a slot for a mark for it being shown that it is a cathode side.

[0019] punching processing of the metal sheet of one sheet which has two or more tooling holes 9 drilled in the shape of a straight line in one side, and moves to it at the time of manufacture as a leadframe is shown in drawing 3 to one shot -- the frame section 10 -- support -- the leadframe 12 with **** which formed successively two or more sets (drawing 5 grouping) in the shape of a series has obtained the leadframes 1A and 1B supported by Legs 11A and 11B namely, leadframe 1A by the side of the anode which attaches the Light Emitting Diode chip 5 (refer to drawing 2) between the frame section 10 of right and left of the leadframe 12 with ****, and 10 so that a part may be expanded to drawing 5 and it may be shown and leadframe 1B by the side of the cathode which counters this -- symmetrical -- arranging -- respectively -- two or more -- a pair of support -- it is made to have supported by Legs 11A and 11B

[0020] Both the leadframes 1A and 1B arrange lead-terminal 1Aa and 1Ba at the nose of cam, respectively, lead-terminal 1Aa by the side of an anode forms the round 4 which mounts the Light Emitting Diode chip 5 on a point, the point of lead-terminal 1Ba by the side of a cathode and some interval are maintained, and it is made to have countered. moreover -- both -- lead-terminal 1Aa and 1 -- Ba connects the end face side to arc-shaped lead induction 1Ab and 1Bb -- making -- this lead induction 1Ab and 1Bb -- respectively -- a right-and-left edge -- foot-like lead pars intermedia 1Ac and 1 -- it is made to make it connect with lead base 1Ad and 1Bd through Bc each -- lead base 1Ad and 1Bd are formed in a right and left long size, and it is made for the end to have projected and they enable it to use this end for the polar zone

[0021] both -- lead-terminal 1Aa and 1Ba pierce, and are caudad bent by press-forming processing after processing in the mid-position, and it is made to make a point have held horizontally on the level of some lower part from the sheet side (refer to drawing 7) in order [in addition,] to make the both ends of lead induction 1Ab and 1Bb engage with the resin by which molding is carried out -- engagement -- the hole 13 is made furthermore -- both -- make it jut out the overhang sections 10a and 10b of predetermined width of face over the pars intermedia of the frame sections 10 and 10 of the right-and-left both sides which overlook the opposite part of lead-terminal 1Aa and 1Ba in the shape of opposite -- it constitutes in the joint with the overhang sections 16a and 16b of the lieberkuhn 14 with **** which carries out a postscript In addition, the light-transmission nature resin 2 which carries out mould fabrication was shown in drawing by the

imaginary line.

[0022] the lieberkuhn 14 with **** which made the lieberkuhn [two or more (drawing five pieces)] 7 corresponding to the leadframes 1A and 1B of the leadframe 12 with **** as shown in drawing 4 -- the aforementioned leadframe 12 with **** -- the same -- the object for positioning of plurality [one side / shape / of a series] -- it is obtained by punching processing or etching processing, and press-forming processing of a metal sheet which formed holes 15 successively That is, the lieberkuhn 7 is obtained by carrying out press forming to a concave surface by punching processing of a plate-like metal sheet or press-forming processing after etching processing.

[0023] the overhang sections 16a and 16b of the predetermined width of face prepared in the pars intermedia of the frame sections 16 and 16 of right-and-left both sides so that this lieberkuhn 7 might be expanded also to drawing 6 and it might be shown -- support -- it is made to be supported through a leg 17 in addition, the time of press-forming processing -- support -- a leg 17 is bent caudad in a point or the mid-position, and has supported the lieberkuhn 7 horizontally on downward level from the sheet side (refer to drawing 7)

[0024] The overhang sections 16a and 16b are constituted as mentioned above in the joint put on the overhang sections 10a and 10b of the leadframe 12 with ****, and they are set up so that the Light Emitting Diode chip 5 attached in lead-terminal 1Aa of the leadframe 12 with **** by the spot welding between this overhang section may be located in the focus of the lieberkuhn 7. moreover, this time -- both -- lead-terminal 1Aa and 1Ba are arranged, without contacting the lieberkuhn 7, the form, i.e., state where it floated, over the periphery section In addition, it pierces from a copper alloy sheet with a same thickness of 0.15mm, and is obtained by processing, and, as for the leadframe 12 with **** and the lieberkuhn 14 with **** which showed the light-transmission nature resin 2 by which a mould is carried out by the imaginary line and which were produced in this way, both the punching sheet has given 1 micrometer nickel plating and 2-micrometer silver plating to the whole surface. And especially about the lieberkuhn 14 with ****, gloss plating finishing has been carried out so that average glossiness may become 0.8 or more. Although not both sheets may be the same material and you may not be the same thickness, if it is made the same thickness with the same material in this way, down stream processing will be simplified further.

[0025] And first, about the leadframe 12 with ****, the Light Emitting Diode chip 5 is attached in the tooth back of the round 4 of lead-terminal 1Aa of leadframe 1A, and bonding of the polar zone of the Light Emitting Diode chip 5 and the lead-terminal 1Ba by the side of leadframe 1B is carried out with the golden wire 6 (refer to drawing 2).

[0026] Subsequently, by doubling and piling up each overhang sections 10a and 10b of the leadframe 12 with ****, and each overhang sections 16a and 16b of the lieberkuhn 14 with ****, and carrying out spot welding of between this overhang section like drawing 7 Leadframes 1A and 1B and the lieberkuhn 7 which attached the Light Emitting Diode chip 5 are combinable with one. The mould fabrication of lead-terminal 1Aa which sets the obtained unification sheet in a plastic molded type, and includes the lamp mechanism section 7, i.e., the lieberkuhn, and the Light Emitting Diode chip 5 with the light-transmission nature resin 2, lead induction 1Ab which supports 1Ba and this lead terminal, and the 1Bb portion is changed into a laying-under-the-ground state by the position relation. It is fixable.

[0027] support of the leadframe 12 with **** which the mold goods which gave the resin mould move a mold further, and it began to see from a mould Plastic solid -- Legs 11A and 11B -- cutting -- moreover, support of the lieberkuhn 14 with **** -- two or more lamp equipment materials can be obtained by cutting a leg 17 and separating each frame section 10 and 16 The obtained lamp equipment material bends caudad lead pars intermedia 1Ac of Leadframes 1A and 1B, and 1Bc along with the lateral surface of a mould Plastic solid by foaming processing. While inserting lead base 1Ad and 1Bd into the base side of a mould Plastic solid in the shape of level and constituting in an equipment back face, i.e., the plane of composition to a substrate The form as lamp equipment A by Light Emitting Diode shown in drawing 1 and drawing 2 is prepared by bending further the end of lead base 1Ad and 1Bd up. In addition, the upper surface crevice of the light-

transmission nature resin 2 carries out mirror-plane processing, and is formed in the flat-surface radial plane 3, i.e., an optical drawing aperture. That is, luminescence from the Light Emitting Diode chip 5 can be reflected by the lieberkuhn 7, and it can be made to emanate ahead from the optical drawing aperture 3 on top without the optical leakage from the side in this lamp equipment A.

[0028] Although the above operation gestalt explained the desirable example to the mass production which has arranged two or more lieberkuhn which arranges two or more leadframes on the metal sheet of one sheet, and corresponds to the metal sheet of one sheet at the aforementioned leadframe, of course, it is also possible to arrange the leadframe and lieberkuhn for a lot on the metal sheet of one sheet each, respectively, and to manufacture them on it if needed.

[0029] Especially in the lamp equipment of this invention, since envelopment laying under the ground of the lieberkuhn is completely carried out with the light-transmission nature resin and it insulates thermally [the lieberkuhn and a leadframe] and electrically, there is no trouble in luminescence reflection nature, and it is not influenced of heating by the pewter reflow at the time of substrate mounting.

[0030] In addition, a leadframe with **** and the lieberkuhn with **** can also be **(ed) by etching processing corresponding to the miniaturization of equipment. thus, the leadframe and lieberkuhn used as the parts which constitute a lamp mechanism -- press punching processing and etching processing of a metal sheet -- furthermore, since it was made to be easily obtained by press-forming processing, a manufacturing process is simplified and mass-production nature improves by making a leadframe sheet and a reflector sheet make two or more the leadframes and lieberkuhn of a group, respectively, and producing two or more sets of lamp equipments simultaneously especially; mass-production nature is boiled markedly and improves

[0031] Without using an optical fiber by having the function to extract luminescence of a Light Emitting Diode chip on a beam by the lieberkuhn which counters, and carrying infrared Light Emitting Diode, it has the condensing function to be able to carry out space transmission precisely in pinpoint to the narrow field of specification [a lightwave signal], and to suppress distribution of a light energy, space transmission can be carried out to a long distance in the light, and this invention is carrying out [therefore] the following application as it is possible.

[0032] ** Carry out space transmission of the voice and the image data of a video camera at a television monitor equipped with the photo detector of 5m or more beyond. ** Carry out space transmission of the image data of a digital camera at a personal computer equipped with the photo detector of 5m or more beyond. ** Measure the vehicles interval of the upper shell automobile of a signal. ** A penetration object is detectable covering a long distance 5m or more. ** Even if 5m or more away, remote control of a household-electric-appliances device equipped with a photo detector can be performed. Furthermore, it can be used suitable for the optical LAN for ** space transmission (Local Area Network : small-scale field communication network).

[0033]

[Effect of the Invention] The leadframe material with **** in which this invention attached the Light Emitting Diode chip, This leadframe material with **** is separating garbages, such as **** which contains a joint while uniting with the form which joins between **** the lieberkuhn material with **** produced on another object, and carries out full envelopment of the equipment important section by the light-transmission nature resin. It is mechanically strong, there is no part thermal influenced by the pewter reflow at the time of substrate mounting, and the effect that the lamp equipment for optical communication which is excellent in luminous-radiation nature is obtained is done so.

[0034] Since it does not have a resin interface between the lieberkuhn and a light-transmission nature resin, the effect that there is no functional degradation by osmosis of the atmosphere, moisture, etc. is done so.

[0035] Moreover, a manufacturing process becomes easy, shortens production time sharply, and does so the effect of realizing cost reduction.

[0036] By using the metal web material which gave an glossy metal sheet or glossy metal plating, processing can be done comparatively cheaply, the metal thin film formation by processings, such

as troublesome vacuum evaporation, is unnecessary, and makes an expensive facility unnecessary, and especially the lieberkuhn does so the effect that the cost of lamp equipment can be reduced. Moreover, since polishing of the lieberkuhn is not needed, the effect that it is cheaply producible with a sufficient precision is done so.

[0037] The lieberkuhn is produced by punching of a metal web material, or etching and press working of sheet metal, and a manufacturing process is simplified by [with the leadframe by punching of the same metal web material, or etching] combining. Moreover, although this invention does not limit both the metal web material to the thing of the same quality of the material or the same thickness, the effect that all manufacturing processes including giving the thing of the same thickness, then the same plating simplify both the metal web material further with the same quality of the material is done so.

[0038] And the effect that the mass-production nature of lamp equipment improves remarkably is done so by making the lieberkuhn corresponding to two or more sets of leadframes, and this on the metal sheet of one sheet, respectively.

[0039] By bending a lead terminal, and setting and arranging an interval with the lieberkuhn, the effect that the Light Emitting Diode lamp which does not need to attach in the lieberkuhn, does not need to prepare a slot, is excellent also in electric insulation, does not have concern of optical leakage, either and is excellent in luminous-radiation nature is obtained is done so.

[0040] Moreover, what was used as the equipment which bends the leadframe exposed to the exterior of a light-transmission nature resin along with a mould Plastic solid, and comes to insert an edge into a base side does so the effect that mounting to a substrate is easy while it is strong and compact.

[0041] Furthermore, since this invention can extract collimation to a distant specific narrow field and can make Light Emitting Diode luminescence go straight on to it comparatively, space transmission of it can be carried out without using an optical fiber, and it does so the effect that it can use for the data transmission to the television monitor from a video camera, data transmission to the computer from a digital camera, or the optical LAN for space transmission.

[Translation done.]